

**Official Transcript
In The Matter Of
STARFLEET vs. THE DOCTOR**

Vol. 1

Dec. 31, 2016

OFFICIAL TRANSCRIPT - Dec. 31, 2016

Presiding: Captain Phillipa Louvois

Prosecution: Captain Picard

Defense: Commander Riker

Expert Witness for the Prosecution:

Robert Guiler

Charges:

Kidnapping

Assault

Violation of the Temporal Prime Directive

Executive Summary

100% Completion!

1) What is the secret message in Santa's tweets?

- "BUGBOUNTY"

2) What is inside the ZIP file distributed by Santa's team?

- This ZIP file contains the APK file for the Android application "SANTAGRAM4.2"

3) What username and password are embedded in the APK file?

- **Username:**guest **Password:**busyreindeer78

4) What is the name of the audible component (audio file) in the SantaGram APK file?

- discombobulatedaudio1

5) What is the password for the "cranpi" account on the Cranberry Pi system?

- **Password:** yummycookies

6) How did you open each terminal door and where had the villain imprisoned Santa?

1. **Workshop->DFER:** The password to the door can be retrieved by killing the wumpus. After consulting the wikipedia page for some strategy, I killed the wumpus within a few tries. Password:"WUMPUS IS MISUNDERSTOOD"
2. **Workshop->Santa's Office:** The password to the door can be retrieved by navigating to the password file and viewing it. A full write up is in Reference 2 below. Password:"open_sesame"
3. **Santa's Office->The Corridor:** The password to the door can be retrieved by participating in the "WarGames" simulation. A full write up is in Reference 3 Below. Password:"LOOK AT THE PRETTY LIGHTS"
4. **Workshop-Train Station:** To activate the train, access the "HELP" menu. This menu is accessed using LESS. Commands can be run inside of LESS using the '!' character. "! ./Activate_Train" will activate the train.
5. **Elf House #2 -> Room #2:** The password to the door can be retrieved in two parts. The first part can be accessed by utilizing sudo to run strings on the pcap file. A full write up is in Reference 4 below. Utilizing the answer from part 1 "santasli", it is possible to hypothesize that the answer is "santaslittlehelper". The second part of the password can be gained by base64 encoding the pcap, so that it can be removed from the terminal. An executable file can be carved out of the pcap, returned to the terminal, and run to reveal the rest of the password. A full write up is in Reference 4 below. Password: "santaslittlehelper"
6. Santa was hidden in the DFER room in 1978. Path: Workshop-TrainStation-> 1978, Access Santa's Workshop (1978), Santa's Workshop (1978) ->DFER (1978)

7) For each of those six items, which vulnerabilities did you discover and exploit?

- **The Mobile Analytics Server (via credentialed login access)**
 - **Vulnerability:** Password Reuse between SantaGram4.2 and analytics server. Full write up in Reference 5 below.

- **The Dungeon Game**
 - **Vulnerability:** Lazy elves did not make significant changes to the game from “Zork”. Existing guides proved useful. Full write up in Reference 6 below.
- **The Debug Server**
 - **Vulnerability:** Debug message sent to server with verbose option set caused server to display flag location. Full write up in Reference 7 Below.
- **The Banner Ad Server**
 - **Vulnerability:** Poor execution of client side design allowed meteor miner to view the audio file location. Full write up in Reference 8 below.
- **The Uncaught Exception Handler Server**
 - **Vulnerability:** PHP local file inclusion vulnerability submitted via a JSON request leaked the location of the audio file. Full write up in Reference 9 below.
- **The Mobile Analytics Server (post authentication)**
 - **Vulnerability:** Exposed GIT repository revealed unchanged administrator credentials. Administrator “edit.php” function allows the administrator to overwrite saved queries with queries that it should be able to run, allowing access to the audio table. Full write up in Reference 10 below.

8) What are the names of the audio files you discovered from each system above?

1. discombolulatedaudio1.mp3
2. discombobulatedaudio2.mp3
3. discombobulatedaudio3.mp3
4. debug-20161224235959-0.mp3
5. discombobulatedaudio5.mp3
6. discombobulated-audio-6-XyzE3N9YqKNH.mp3
7. discombodulatedaudio7.mp3

9) Who is the villain behind the nefarious plot.

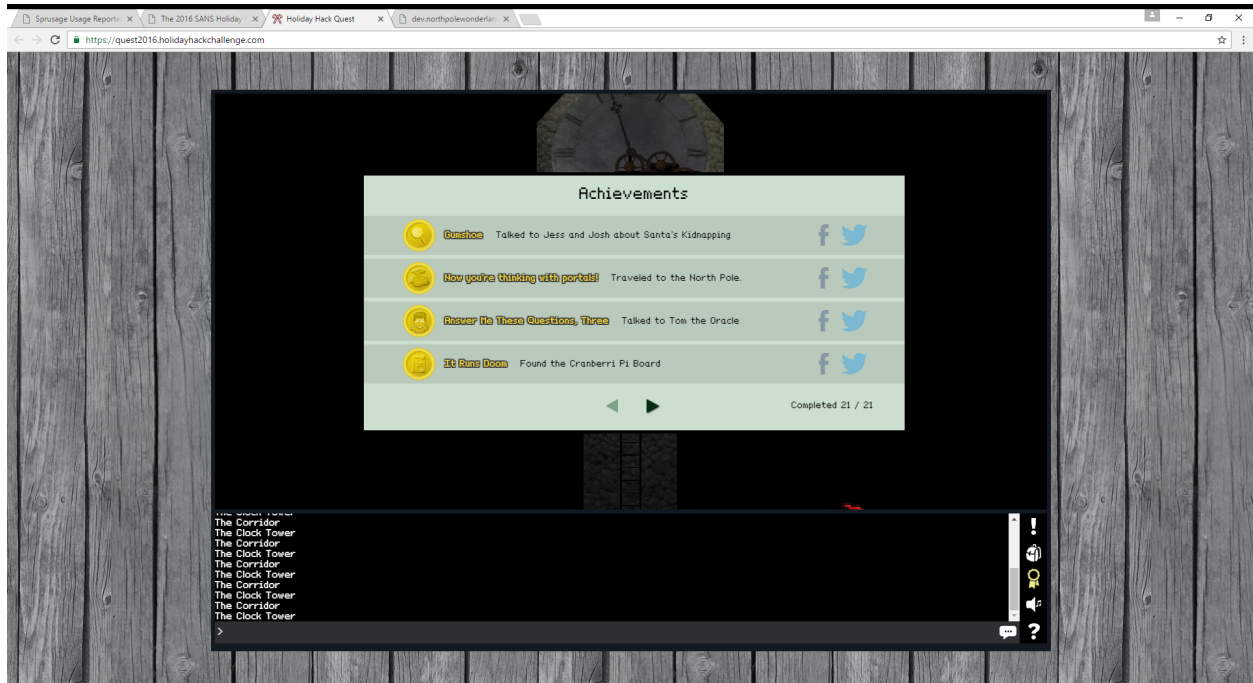
- The Doctor

10) Why had the villain abducted Santa?

- The Doctor hoped to create a world where the Star Wars Christmas Special never happened.

Proof

“father christmas santa claus or as i've always known him jeff”



OFFICIAL STARFLEET TRANSCRIPT

Captain Louvois: "Captain Picard, Call your next witness"

Captain Picard: "The Prosecution calls Mr. Guiler to the stand"

Commander Riker: "Objection! What evidence is there to prove that this man an 'Expert'"

Guiler: "I perform pentest-like evaluations for the Department of Defense, I have a degree in computer science, and I found all 20 Netwars coins for Sparkle Redberry the Elf"

Captain Louvois: "What does that last one have to do with anything?"

Guiler: "Nothing your honor. I just spent a ton of time collecting all those stupid little coins and really wanted someone else to know that I found them all."

Captain Picard: "Mr. Guiler, can you please tell us how you entered the service of a Santa 'Jeff?' Clause?"

Guiler: "Certainly. *'Twas the night before Christmas, and all through the house, not a creature was stirring, except for...* Josh Dosis and his sister Jessica. Right as Santa was delivering their presents, Santa was forcefully abducted from their living room. I had heard the commotion and came to offer assistance. We quickly discovered that Santa had left his business card behind. The business card revealed Santa's social media accounts on twitter and instagram. Further investigation of the @santawclaus twitter account revealed that Santa had coded a message into his tweets. By copying and pasting all of the tweets into a word document, and using the magical power of powershell, I was able to place every tweet together in a single file with no other header information. By looking at all of the ascii text rotated 90 degrees counter-clockwise, I was able to make out the words "BUGBOUNTY" in ascii art. I then looked at the first picture on Santa's instagram account for more clues. By zooming into the picture, a website and file name were clearly visible. By combining these two pieces of information, a ZIP file was retrieved from the web link. (Reference 1)

Inside of this ZIP file was a SantaGram_v4.2 APK file. This file corresponds to the popular SantaGram android application. In our travels, an elf named Shiny Upatree suggested that we use Jadx and Android Studio to investigate the source code of the APK file. By using the Jadx gui to decompile the APK file, I was able to easily search the results for the password I was looking for and discovered the “guest:busyreindeer78” username password combination. Knowing I needed to find an audio file, I investigated the ./res/raw directory, where it would most likely be stored. This is where I discovered discombobulatedaudio1, the first portion of the quote that lead me to suspect The Doctor.

Commander Riker: “All of that just for one piece of the puzzle?”

Guiler: “Yep! When Santa was taken, he left behind a portal to the North Pole. The Dosis siblings and I went through the portal in order to investigate what happened. We came through into the southernmost part of the North Pole. Just beneath the train station. As we ventured north, we were greeted by numerous elves who offered advice on our plight. The elf Holly Evergreen requested that we help her find the five pieces of her cranberry pi. I discovered the Cranberry Pi Board hidden in a secret fireplace room inside of Elf House 1. I found the heat sink in the upstairs storage area of Elf House 2. I came upon the power cord just north of the snowman in the over world of the North Pole. I was barely able to recover the SD card on the walkway west of Santa’s workshop just before it fell to its doom. The final piece, the HDMI cable, was behind Santa’s reindeer in the Workshop. With all five pieces found, I spent 45 whole seconds climbing back down a tree, going through the netwars room, and walking through the entire North Pole back to Holly. You would think a fat guy like Santa would have shortcut portals everywhere.

Holly gave me access to the Cranberry pi image so I could crack the password for her. I already had john ready on my Kali linux box, but my unshadow procedures were a bit rusty and I didn’t want to overdo it with my rainbow tables. Thankfully the elf named Minty Candycane suggested using the RockYou password list. With a quick consultation of the oracle on how to unshadow...”

Captain Louvois: “I’m sorry. The oracle?”

Guiler: “You know... google? So I ran unshadow on the password file and the shadow file and directed the output to a “To Crack” file. Then I just ran ‘john -wordlist=rockyou.txt ToCrack’ and

it told me it was finished. With a quick 'john -show ToCrack', john told me that the password was yummycookies. Holly confirmed that password and told me that I now had access to all of the terminals in the North Pole. “

Commander Riker: “How did you get access to the DFER facility?”

Guiler: “The password to the door can be retrieved by playing a game that ends with you killing the wumpus. After playing the game the first time and quickly finding the wumpus and my doom, I searched google for some strategy to the game. Wikipedia explained how the map was set up, how the wumpus was probably coded, and the rules of the game. Armed with this information, I killed the wumpus within a few tries. The game gave me the password: 'WUMPUS IS MISUNDERSTOOD'”.

Commander Riker: “What about Santa’s Office?”

Guiler: “Apparently the ‘next level’ security at Santa’s workshop is to utilize security through obscurity. The password file was hidden in a number of oddly named directories. I used 'ls -aR' to get a recursive list of all of the directories. I noticed some deviously named directories, but I know how escape characters and hidden directories work, and easily navigated to the password. A full write up is in Reference 2. The Password was open_sesame”.

Commander Riker: “And the Corridor?”

Guiler: “The terminal prompted me with a ‘WarGames’ like prompt. I remembered this prompt from a previous SANS NetWars challenge. In my searches for the exact dialogue from WarGames, I came across a GitHub page for a WarGames script [‘https://github.com/abs0/wargames/blob/master/wargames.sh’](https://github.com/abs0/wargames/blob/master/wargames.sh). All I had to do was change the word [Lets] to [Let’s] and I was able to copy my part of the dialogue word for word. Joshua kicked out the password for me once I was done. A full write up is in Reference 3. The password was ‘LOOK AT THE PRETTY LIGHTS’”

Commander Riker: “Elf House Room 2?”

Guiler: “The password to the door can be retrieved in two parts. The first part can be accessed by utilizing sudo to run strings on the pcap file. Using ‘sudo -l’ will tell you that you can run ‘strings’ and ‘tcpdump’ as the user ‘itchy’. This lets us access the pcap that is only accessible by itchy. By looking through the data, the only thing that stands out are the words ‘santasli’. Utilizing the answer from part 1 ‘santasli’, it is possible to hypothesize that the answer is ‘santaslittlehelper’. The hardest part about part 2 is getting the pcap off of the terminal. I didn’t want to be limited in how I carved out the executable, so I found another way. The second part of the password can be gained by base64 encoding the pcap, so that it can be removed from the terminal via the clipboard. An executable file can be carved out of the pcap, returned to the terminal, and run to reveal the rest of the password. A full write up is in Reference 4. Password: “santaslittlehelper”

Commander Riker: “And the super-secret, time travel train?”

Guiler: “After looking through all of the options on the train terminal, my options seemed pretty limited. This made the solution very easy, because I only had a few attack vectors. After checking to see if I could trick the train’s systems, I realized that the program was using ‘LESS’ to display the HELP file. LESS allows users to run commands from inside of it using the ‘!’ character. I ran a quick ‘! ls’ and noticed an ‘Activate_Train” executable. By typing ‘! ./Activate_Train’ I was forcefully transported to 1978. I want to state for the record that I in no way intended to violate the Temporal Prime Directive.”

Captain Louvois: “You are not the one on trial. Please continue.”

Guiler: “With this new world to search through, we quickly moved through all of the terminal doors with the passwords we had recovered and found Santa. He was still recovering from his

wounds from inside of the DFER facility in his workshop from 1978! Santa thanked us for helping him, but we knew our job wasn't finished. We still needed to hunt down the mysterious kidnapper, to prevent him from trying again. We dove into the SantaGram APK file to find any clues as to where the additional audio files may have been. We found all of the IP addresses for the SantaGram servers. This is shown in Reference 11. After checking with Tom Hessman, to make sure the servers were in the scope of the bug bounty program, we began our assault on Santa's application."

Captain Picard: "Mr. Guiler, in the interest of time, would you please summarize any findings from your bug bounty testing that isn't already shown in references five through ten?"

Guiler: "Certainly Captain. The first flag on the analytics server was in the open. After logging in with the credentials we had acquired previously, we were able to download the MP3 file with a link on the homepage.

The dungeon game server had a service running on port 11111. By connecting to the port with netcat, I was able to play the dungeon game. At first, I was preparing to hack the game to get to the file, but I remembered that elves are way too busy to be programming a game from scratch. A few google searches of the dialogue and help menu made me think that the game was just a modified version of Zork. Thankfully, there are a number of step by step tutorials to the Zork game online. The elves were somewhat clever, and modified the map enough so that I could not simply follow the tutorial blindly. With a few tweaks to the tutorial, I managed to defeat multiple monsters and bring gifts for the elf at the end. After being given a gift, he provided me an email address to email. That email sent me the audio file after I requested it.

The debug server was very simple, but time consuming, because most of the tools refused to work with the virtual machine I was utilizing. Apparently there are some intricacies to turning off hyper-v that I am still not aware of. By following the guide that the elves suggested, I was able to make the changes I mentioned in the reference.

The exception server was very simple. By targeting the server with a json request through curl, the server actually guided me through building out a proper request. After following all of the error feedback, I constructed a legitimate query. Thanks to a blog recommendation by

one of the elves, I was able to view the php code for the page using a json query, which revealed the location of the mp3 file.

The second attack on the analytics server was by far the most difficult. I do not do a lot of work with git repositories, so after noticing one with an nmap -sC, I searched google for how to download it. Thankfully, there were a number of suggestions on tools to use to download and search through git repositories. Unfortunately, there weren't a lot of tutorials for these tools. But with some effort, I was able to parse through the original php files of the analytics server. At first, I hoped to find a vulnerable field for sql injection, but then I noticed some usernames and passwords hard coded into the server. I was able to gain access to the administrator account, who has access to edit saved queries. Luckily, there is a hidden option to modify the query which can be accessed by adding a query variable to the url. I was able to select all of the information from the audio table. Unfortunately the mp3 file will not display here, so I had to cast the mp3 file as base64, copy it out of the web page, and then convert it back to an mp3.

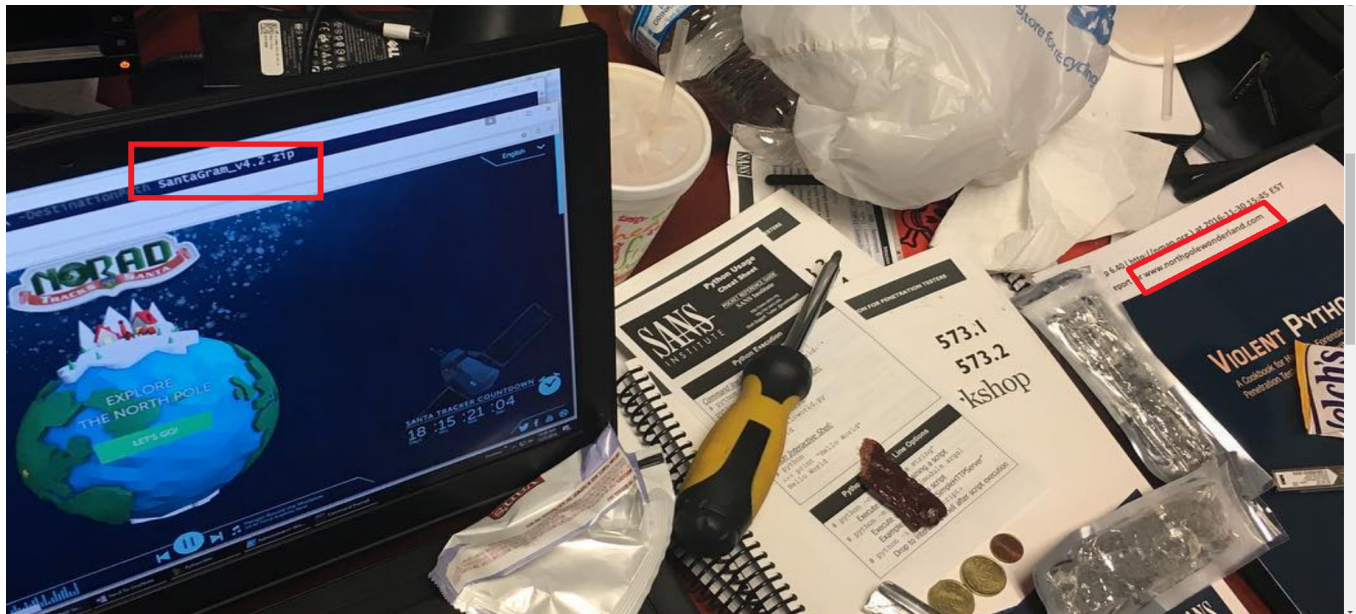
With all of the audio files at my disposal, I knew that the audio discombobulator couldn't be too complicated. If it was changing too many variables, there would be no way to solve the problem. I started by combining all of the audio files using an online mp3 combiner. I then used my media player to speed up the audio. Using the few key words that I could hear, I googled "Christmas or as I know him Jeff" and found a mysterious Doctor Who quote. I used this quote as the password for the corridor door and accessed the clock tower to confront the defendant.

Commander Riker: "A lovely story, but what evidence do you have that it was my client other than an audio clip from his television show?"

Guiler: "Oh... I guess I should have mentioned right away that... he confessed. I have it all on camera in exhibit 12.

Captain Louvois: "Very well. Let's reconvene tomorrow at 0800 with the defense's next witness... a mister... Tardis?"

Reference 1



Reference 2

Run 'ls -aIR' to get a recursive list of all files in the subdirectories.

Run 'ls -aIR | grep key' or 'ls -aIR | grep door' to find the key file faster

```
cd .doormat
```

```
cd ". "
```

```
cd " "
```

```
cd "\\ "
```

```
cd "\\\ \"
```

```
cd D*
```

```
cd Y*
```

```
cd \'
```

```
cat key*
```

This will allow you to quickly navigate to the key file by escaping all of the bad characters or avoiding them entirely with the wildcard character!

Reference 3

<https://github.com/abs0/wargames/blob/master/wargames.sh>

*change Lets to Let's

Enter

Hello.

I'm fine. How are you?

People sometimes make mistakes.

Love to. How about Global Thermonuclear War?

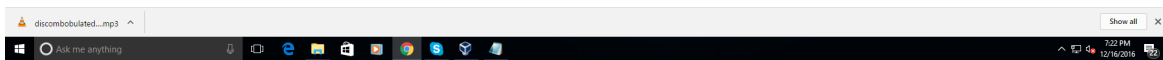
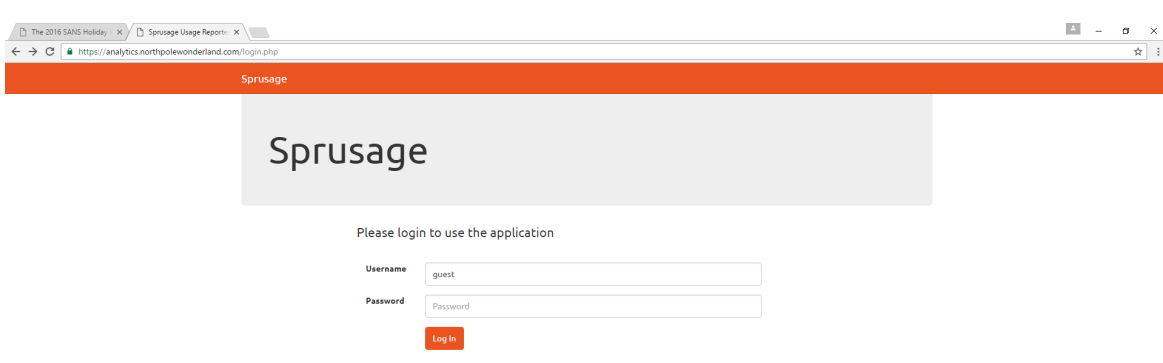
Later. Let's play Global Thermonuclear War.

2

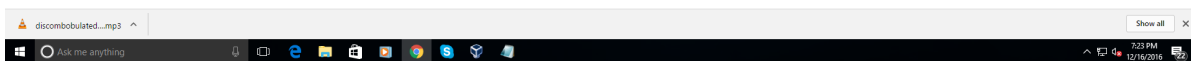
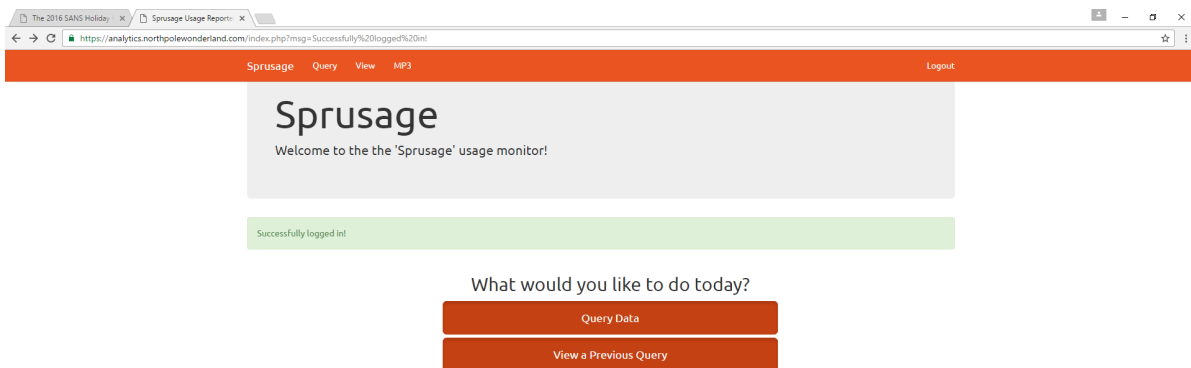
Las Vegas

We receive the key "LOOK AT THE PRETTY LIGHTS"

Reference 5



If we enter our know user/pass combo guest/busyreindeer78



Clicking the mp3 link gives access to discombobulatedaudio2

Reference 6

Thanks to lazy elves, we know that Dungeon is basically just a very basic clone of Zork. You can find this out by taking pieces of the map or help menu and searching for them in google.

A few things are moved around, but we can figure them out pretty easily.

Do this:

Open mailbox

Take leaflet

Read leaflet

Drop leaflet

N

N

Up

Take egg

Open egg

Down

W

E

Open window

Enter window

Take bottle

Take sack

W

Take sword

Take lamp

Move rug

Open trap door

Down

Light lamp

Open sack

Take garlic

Eat garlic

E

(Repeat, if you die, return to this point in new game) kill troll with sword

S

S

E

Up

Take key

Take old leather bag

Sw

E

S

Ne

Odysseus

N

E

Drop key

Drop bottle

Open trap door

Down

S

W

S

S

S

Nw

Drop all

Take egg

Take lamp

Up

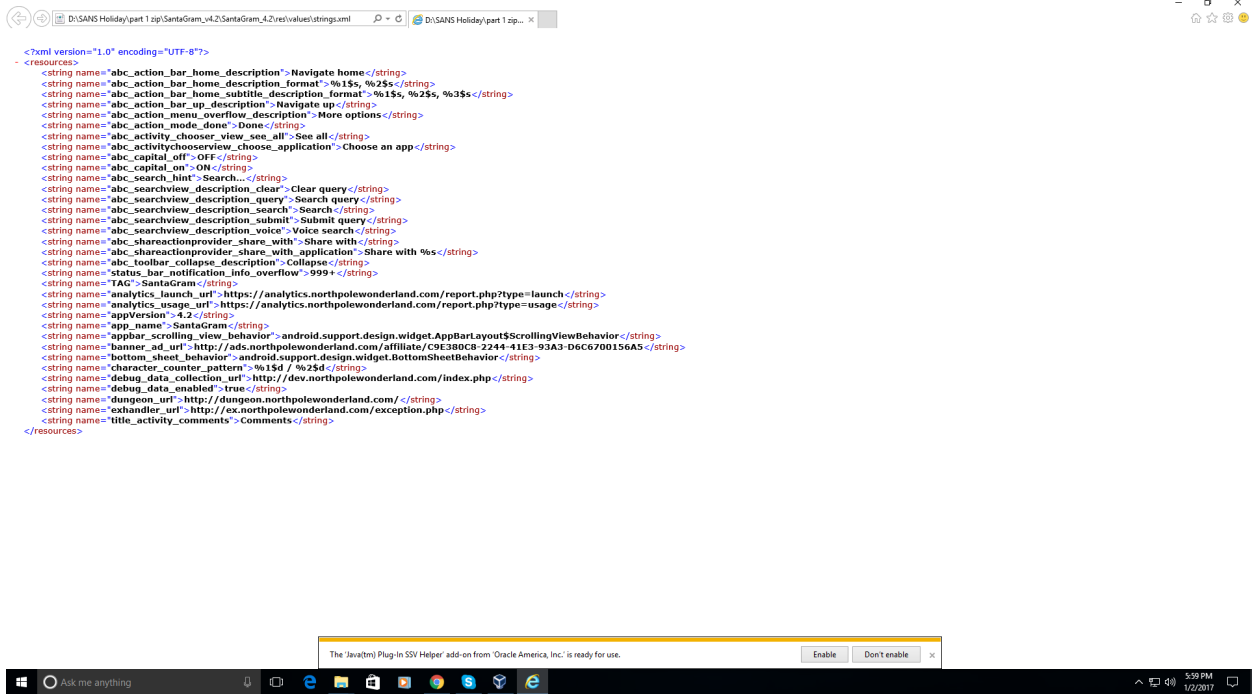
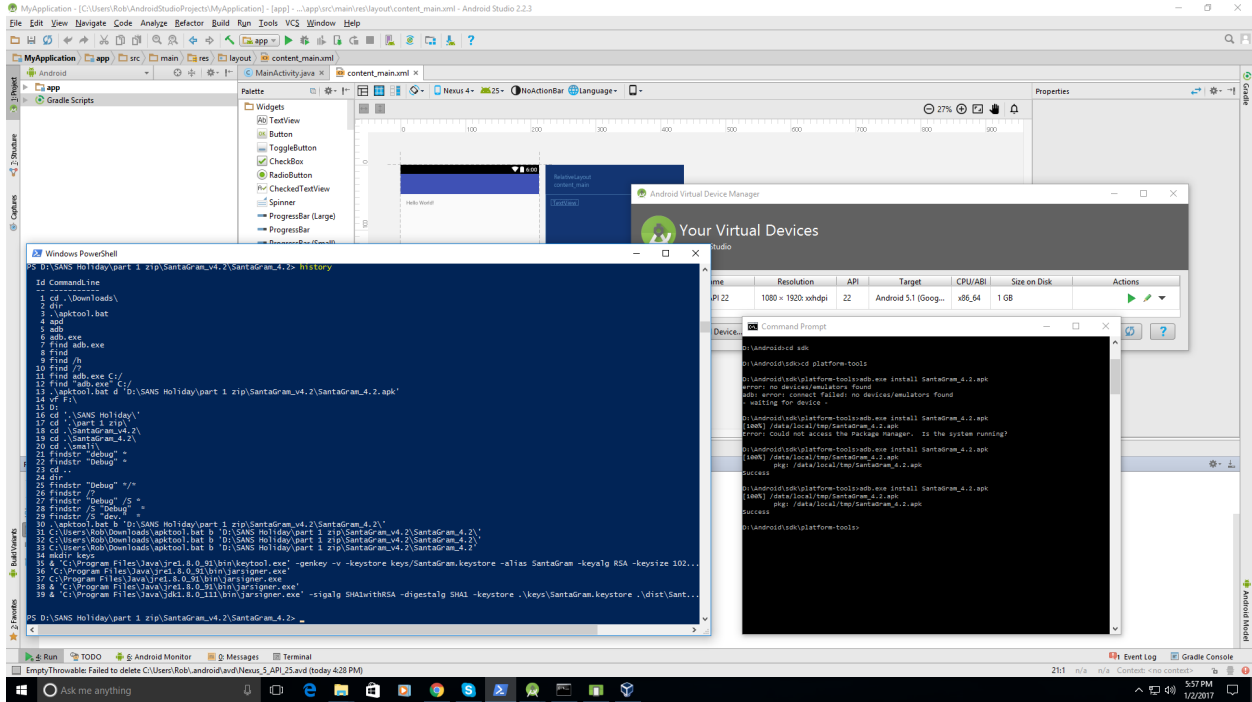
Give egg

The elf will tell you to email him at peppermint@northpolewonderland.com

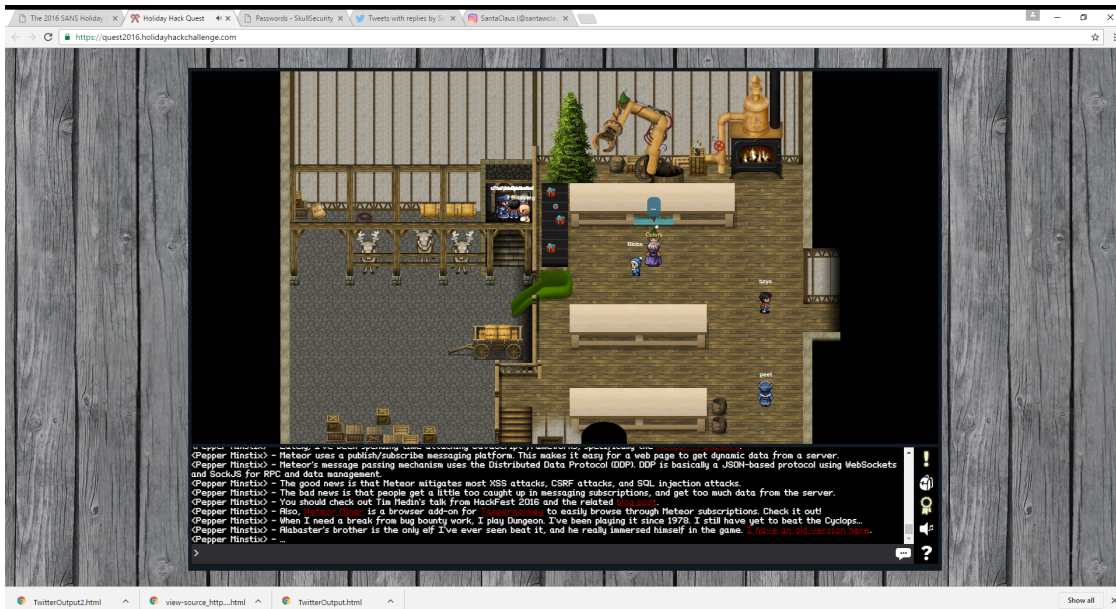
Email him to get the audio file.

The screenshot shows a Gmail interface. The browser address bar displays <https://mail.google.com/mail/#inbox/1590ae95b691568c>. The email header shows it is from 'peppermint' at 'peppermint@northpolewonderland.com', received at 9:53 PM (0 minutes ago). The email body contains the following text: 'You tracked me down, of that I have no doubt. I won't get upset, to avoid the inevitable bout. You have what you came for, attached to this note. Now go and catch your villain, and we will alike do dot.' Below the text is a broken audio player with a red error icon and the text 'discombobulated...'. The interface also shows a 'COMPOSE' button, a search bar, and a 'No recent chats' notification.

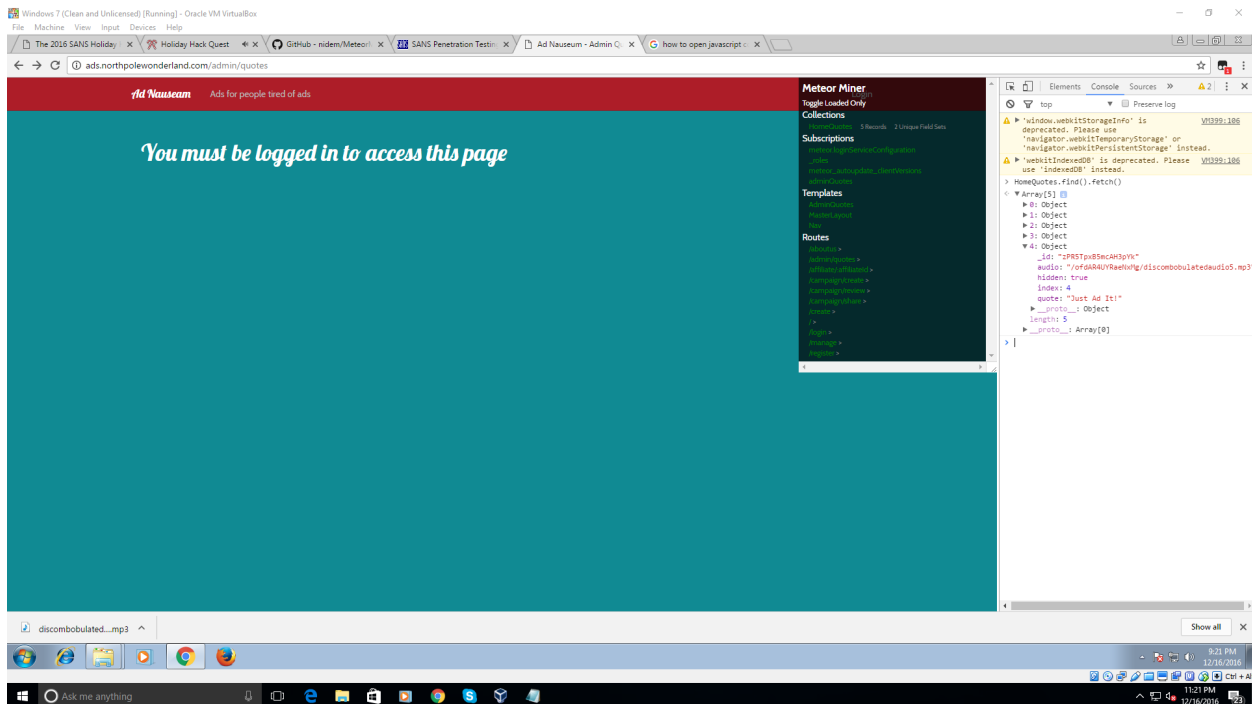
Reference 7



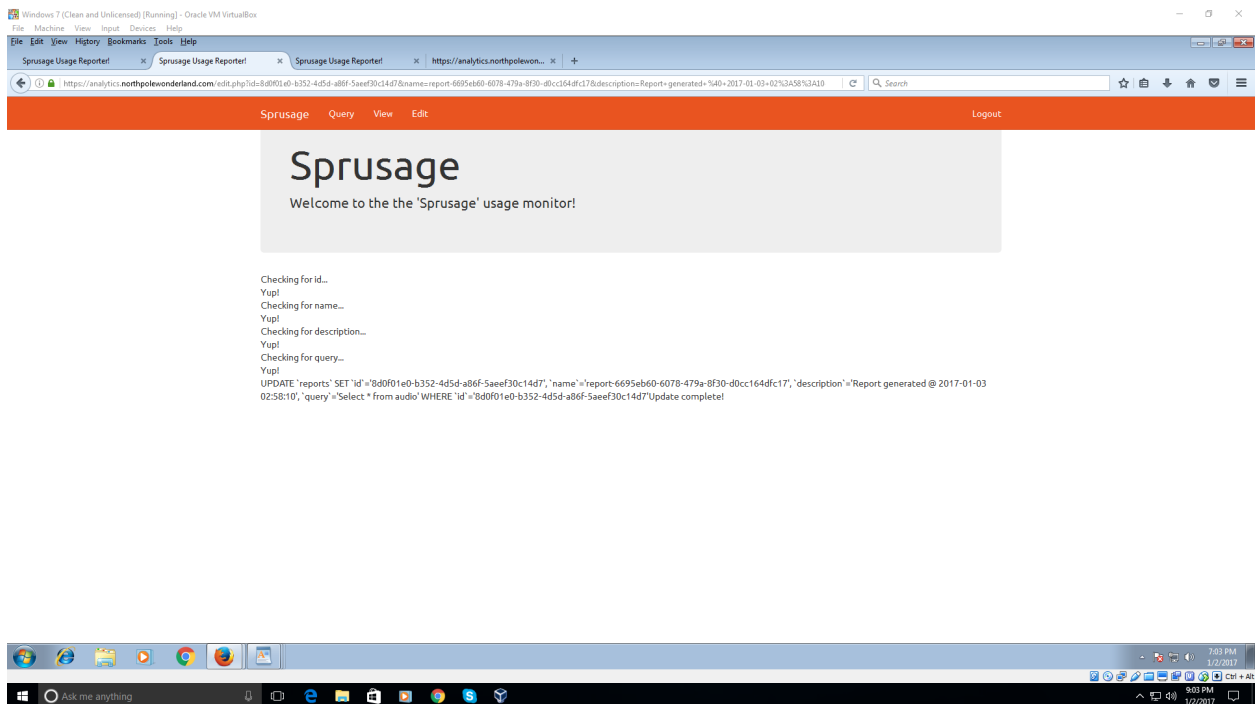
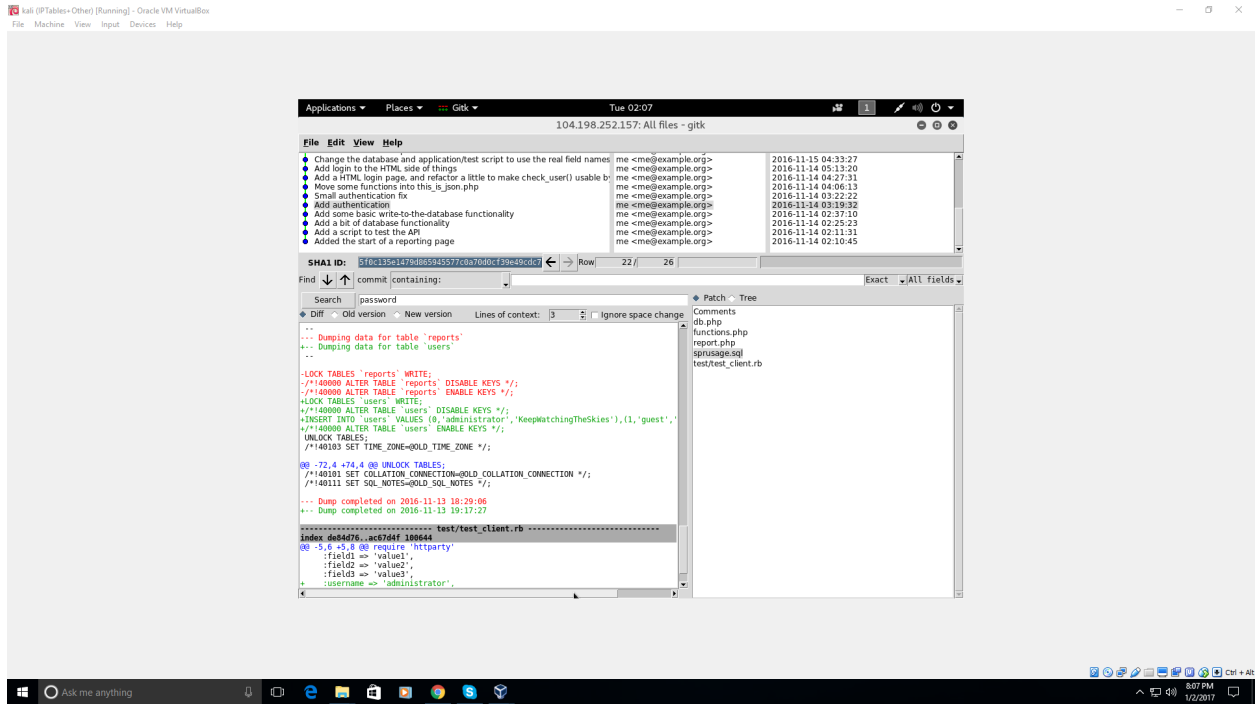
Reference 8

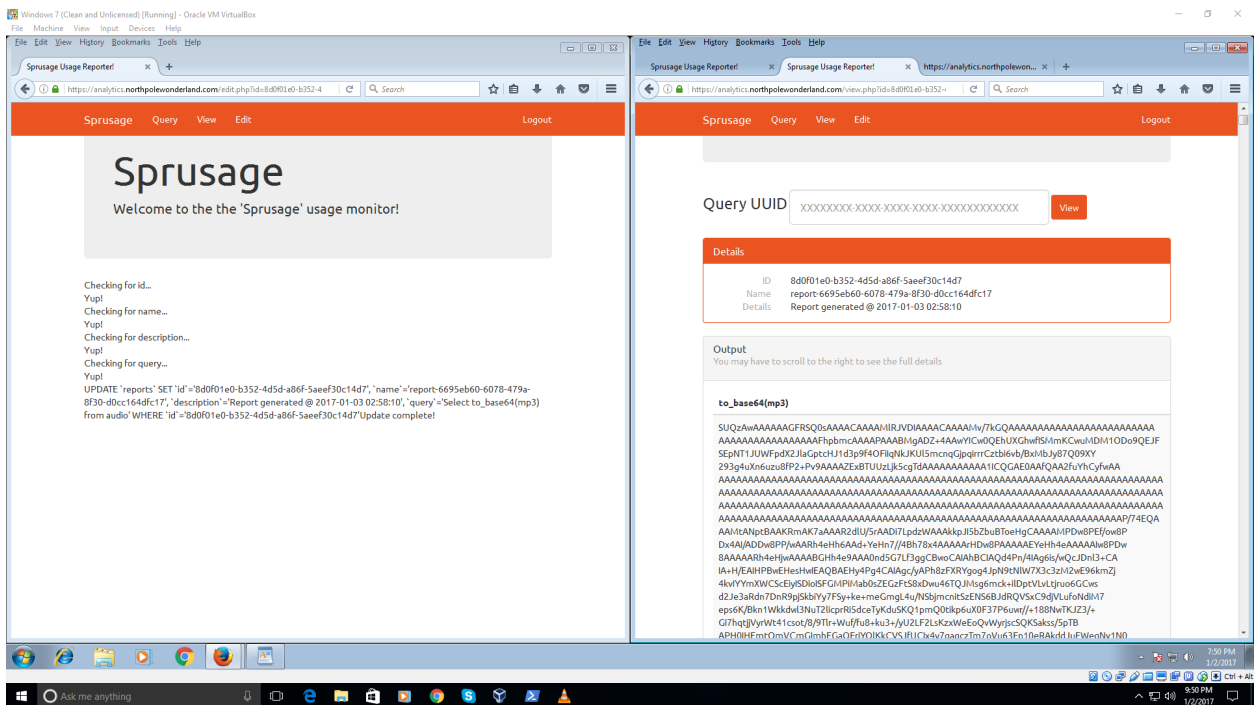
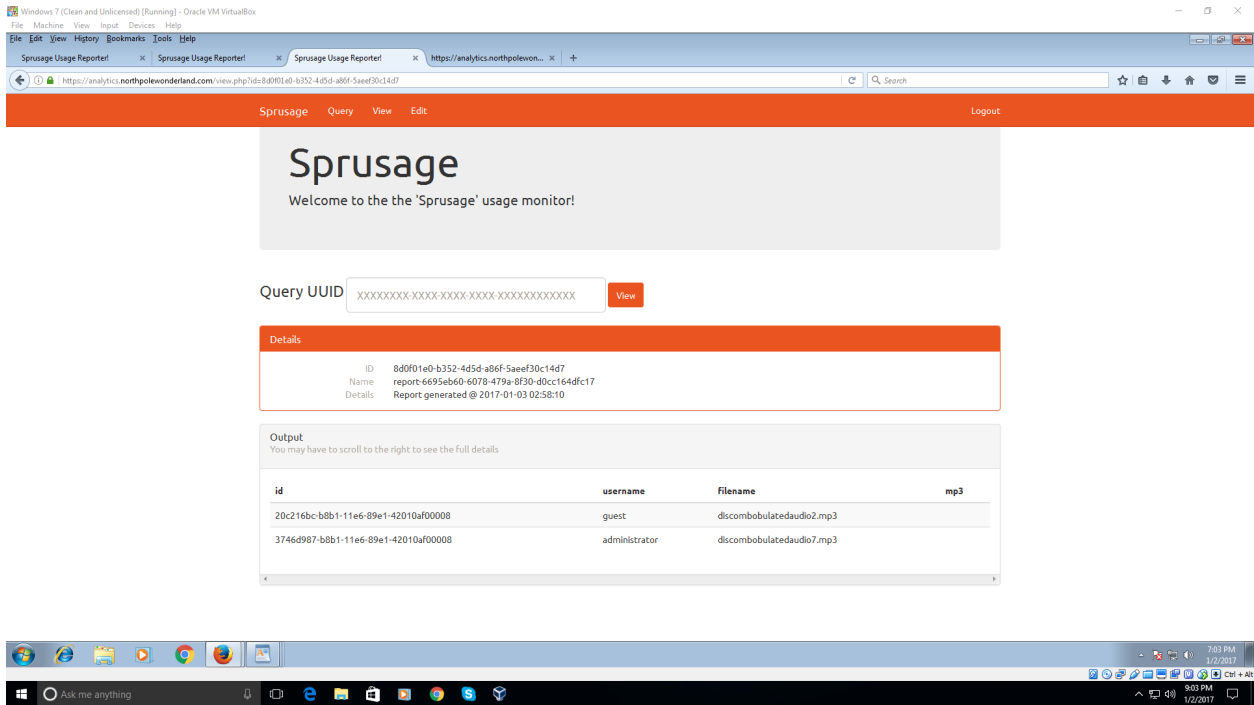


Thanks for the answer Pepper Minstix!

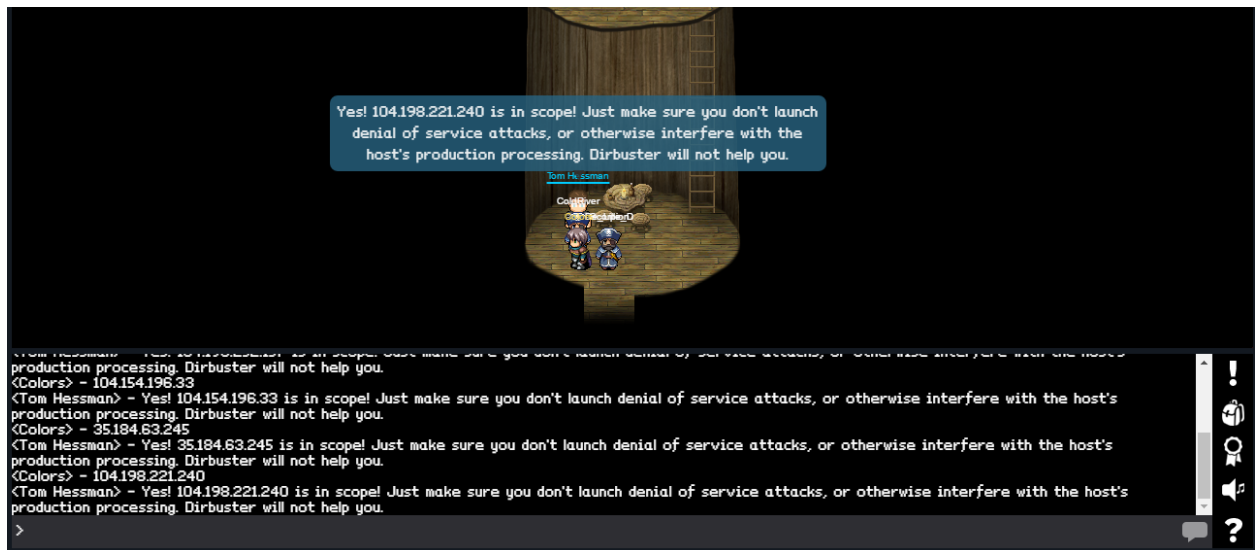
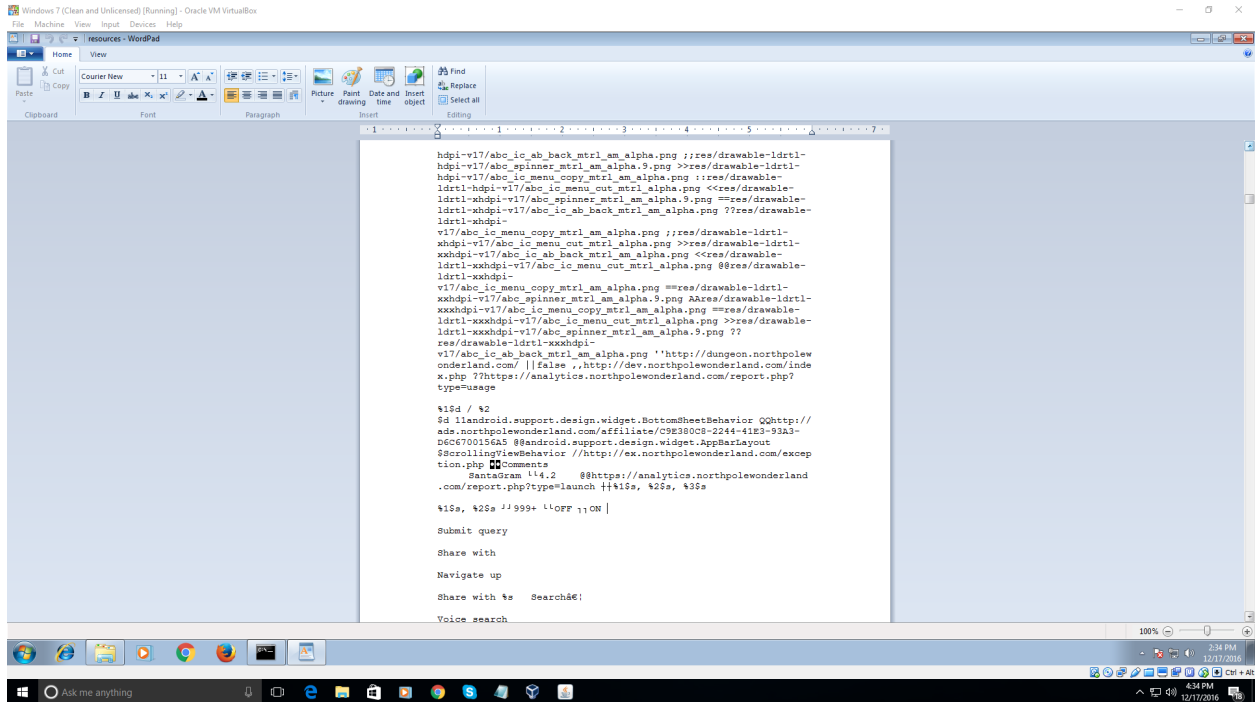


Reference 10





Reference 11



Reference 12

